

WHAT IS CLAIMED IS:

1. A hydrometallurgical process for producing metal-containing sulfide ores and concentrates, comprising reacting said metal-containing sulfide with concentrated sulfuric acid at a temperature of between about 300°C and 400°C in the presence of oxygen to produce a solid metal sulfate product and a gaseous product which is primarily SO₃, wherein said metal is selected from the group consisting of iron, copper, zinc, nickel, cobalt and manganese.
2. A process according to claim 1, wherein said metal sulfate product is then leached with a dilute solution of sulfuric acid, having a concentration of between 5% and 35% to extract metal values therefrom and to form a metal-containing solution.
3. A process according to claim 2, wherein said SO₃ gaseous product formed from said reaction is subsequently combined with said metal-containing solution to raise the concentration of sulfuric acid in said solution to about 35% to 50% and to effect the precipitation of metal from said solution.
4. A process according to claim 4, wherein the amount of sulfuric acid upon mixing with one weight portion of sulfide ore is ≥0.94 weight portions of 98% sulfuric acid.
5. A process according to claim 1, wherein the sulfatization process is carried out at a temperature of between 330°C and 350°C.
6. A process according to claim 1, wherein the sulfatization process is carried out at constant oxidation with oxygen from air, its amount being ≥150% of the stoichiometrically required amount.
7. A process according to claim 1, wherein leaching of the sulfatized product is carried out in solution of sulfuric acid, having a concentration of about 15% to 25%.
8. A process according to claim 3, wherein separation of metal sulfate from the solution was made by its precipitation in sulfuric acid solutions of 40%-45% H₂SO₄.
9. A process according to claim 8, wherein a high concentration of sulfuric acid is achieved by saturation of the solution with gas SO₃ at room temperature.

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10. A process according to claim 9, wherein purification of sulfuric acid from the admixtures aimed at production of the acid ready for sale was performed by saturation with gas SO₃ up to a concentration of sulfuric acid of 98.3%.
11. A process according to claim 1, wherein said metal is iron.